Evaluation of Wetlands Using A Geographic Information System

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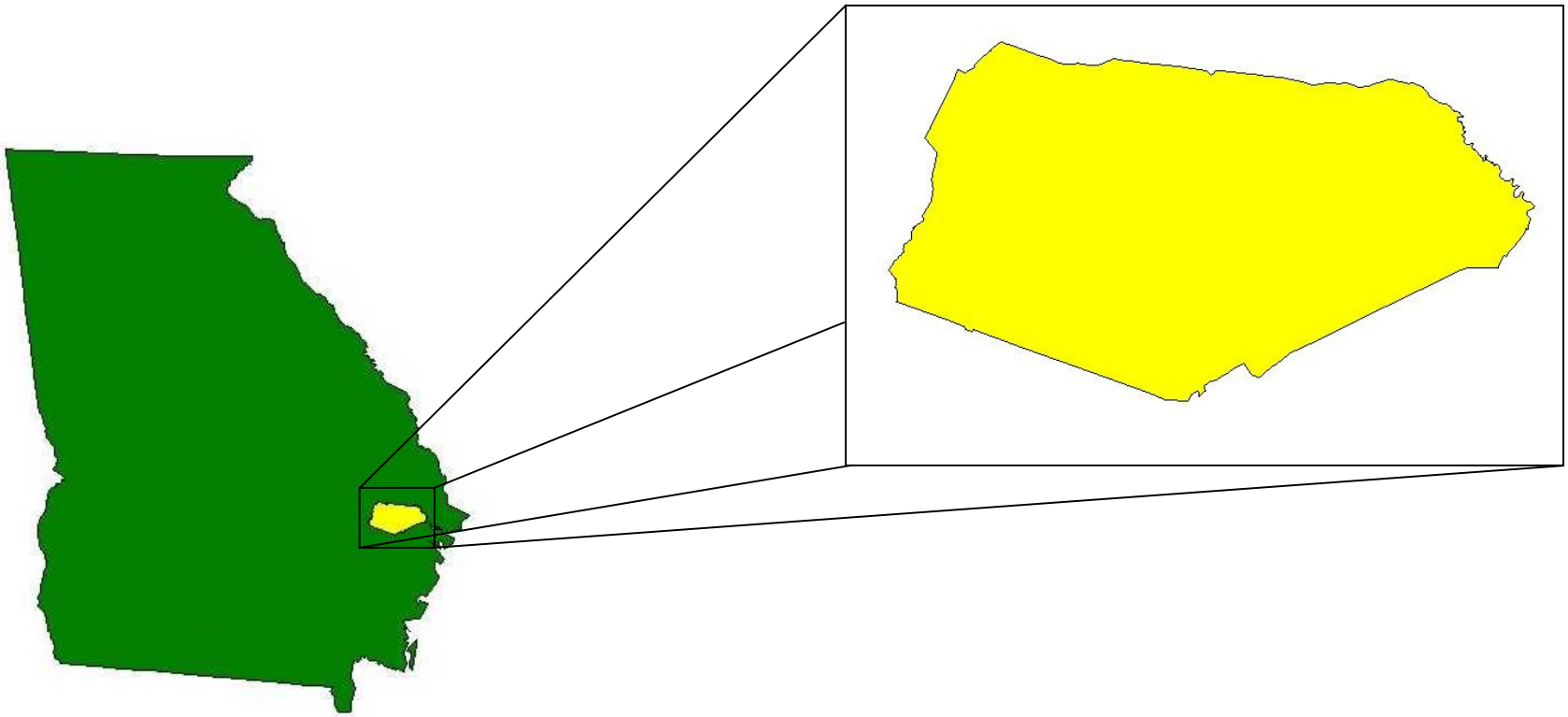
Fort Stewart, Georgia

Home of the 3ID Mechanized

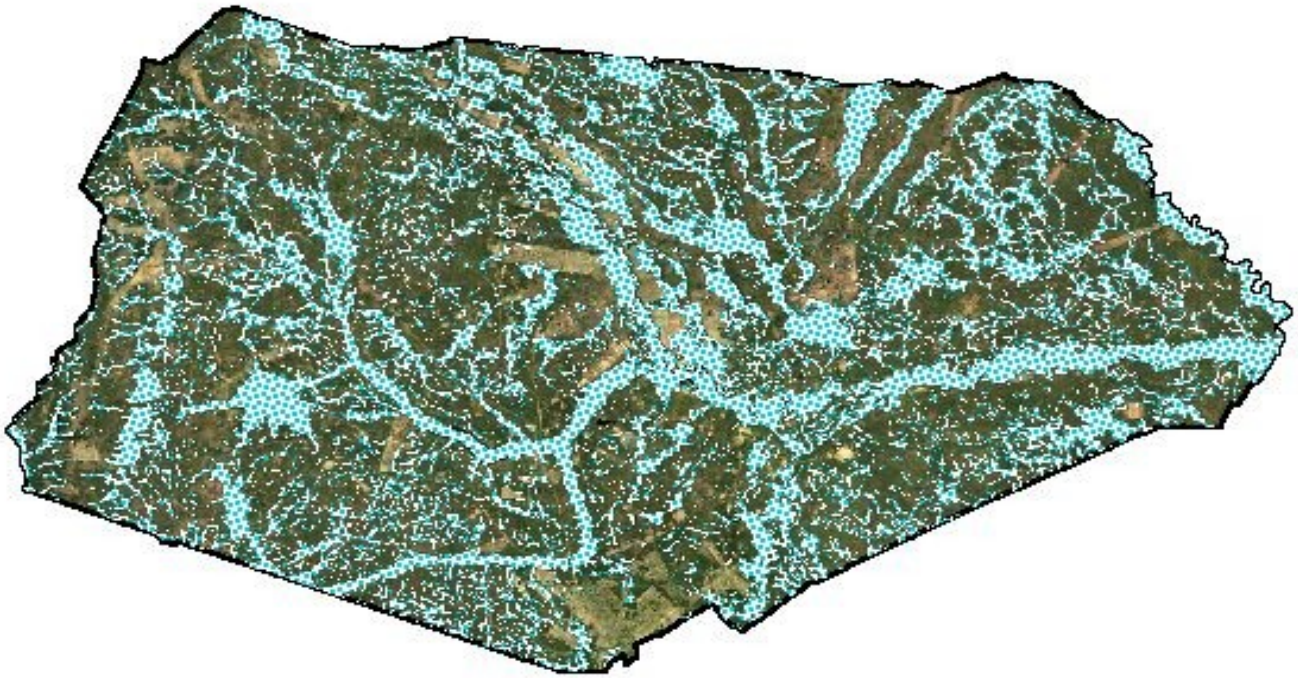
Fort Stewart

Southeastern Coastal Plain of Georgia



“Camp Swampy”

Approximately 93,000 acres of Wetland or 1/3 of the installation



Wetlands Can Cause Problems

Hinder Construction and Rehabilitation Projects

Often Home to Many Threatened and Endangered Species

Flatwoods Salamander

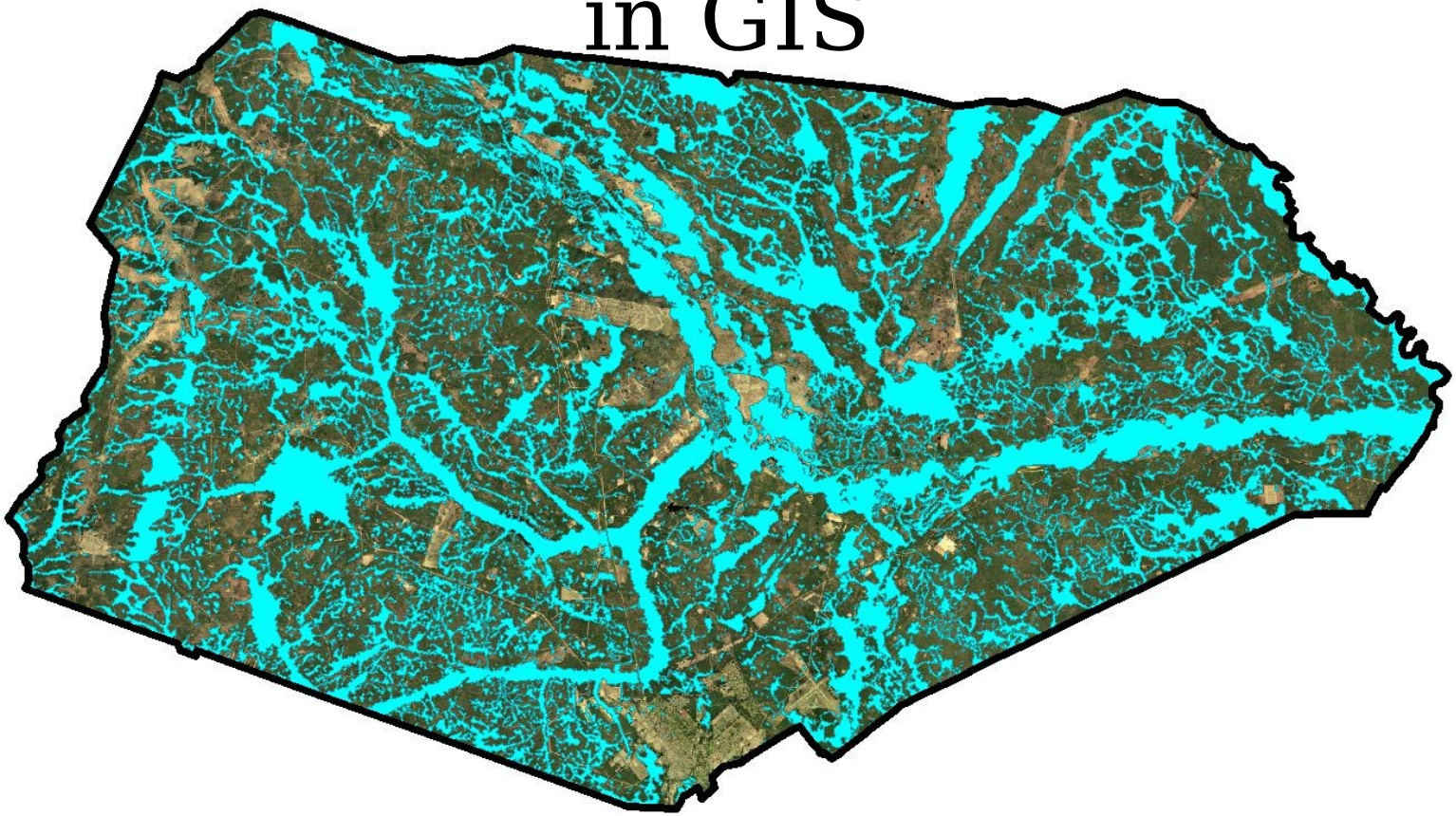
Wetlands Can Be a Hindrance to Training

Wetlands Can Be a Hindrance to Training (Cont.)

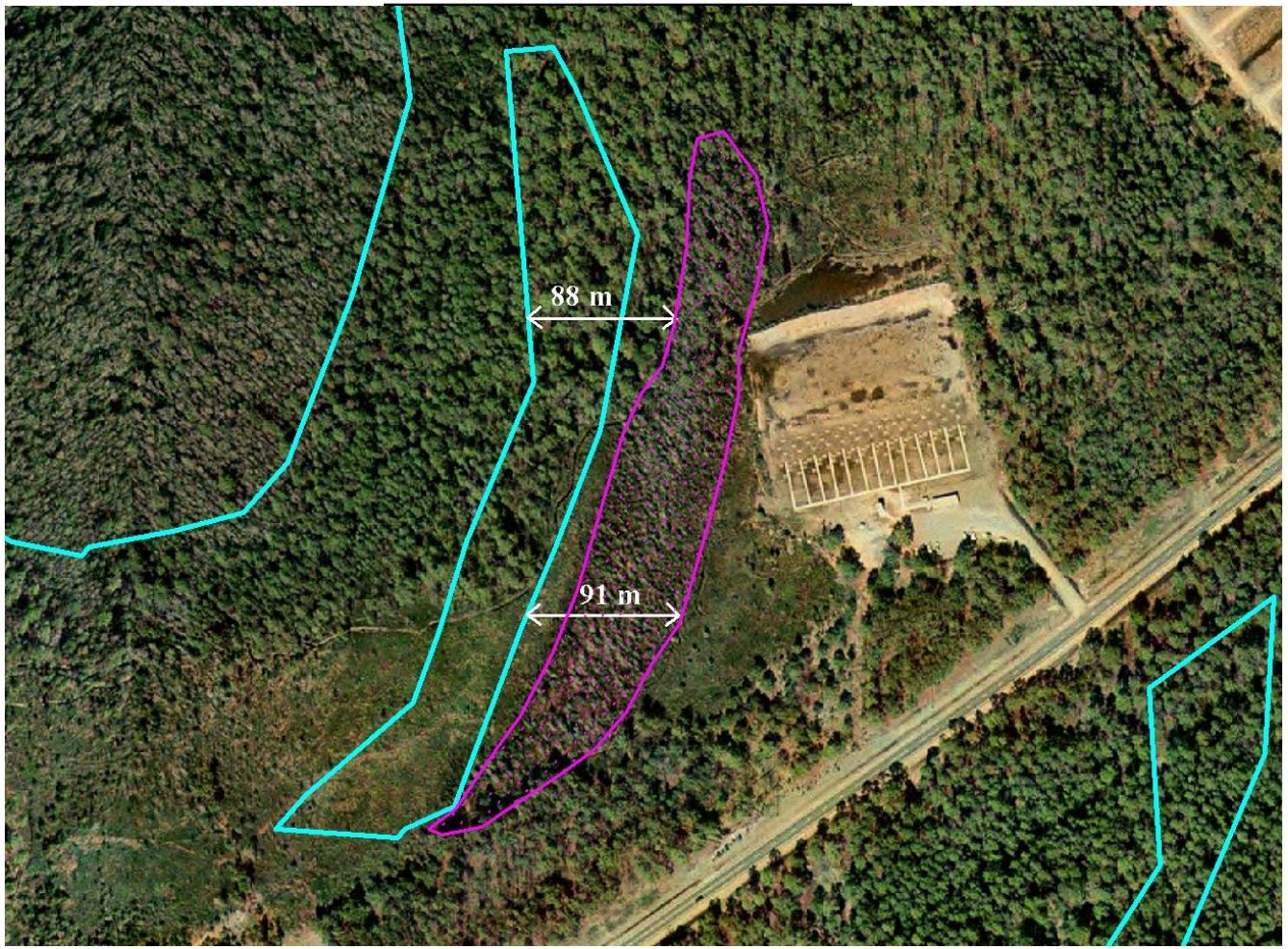
Wetlands Can Be a Hindrance to Training (Cont.)

Wetlands Can Be a Hindrance to Training (Cont.)

The National Wetlands Inventory (NWI): The Standard Tool for Wetland Determination in GIS



But the NWI Can Contain Mistakes



There Was a Need for a More Accurate Wetland Layer

But How?

Wetland Requirements

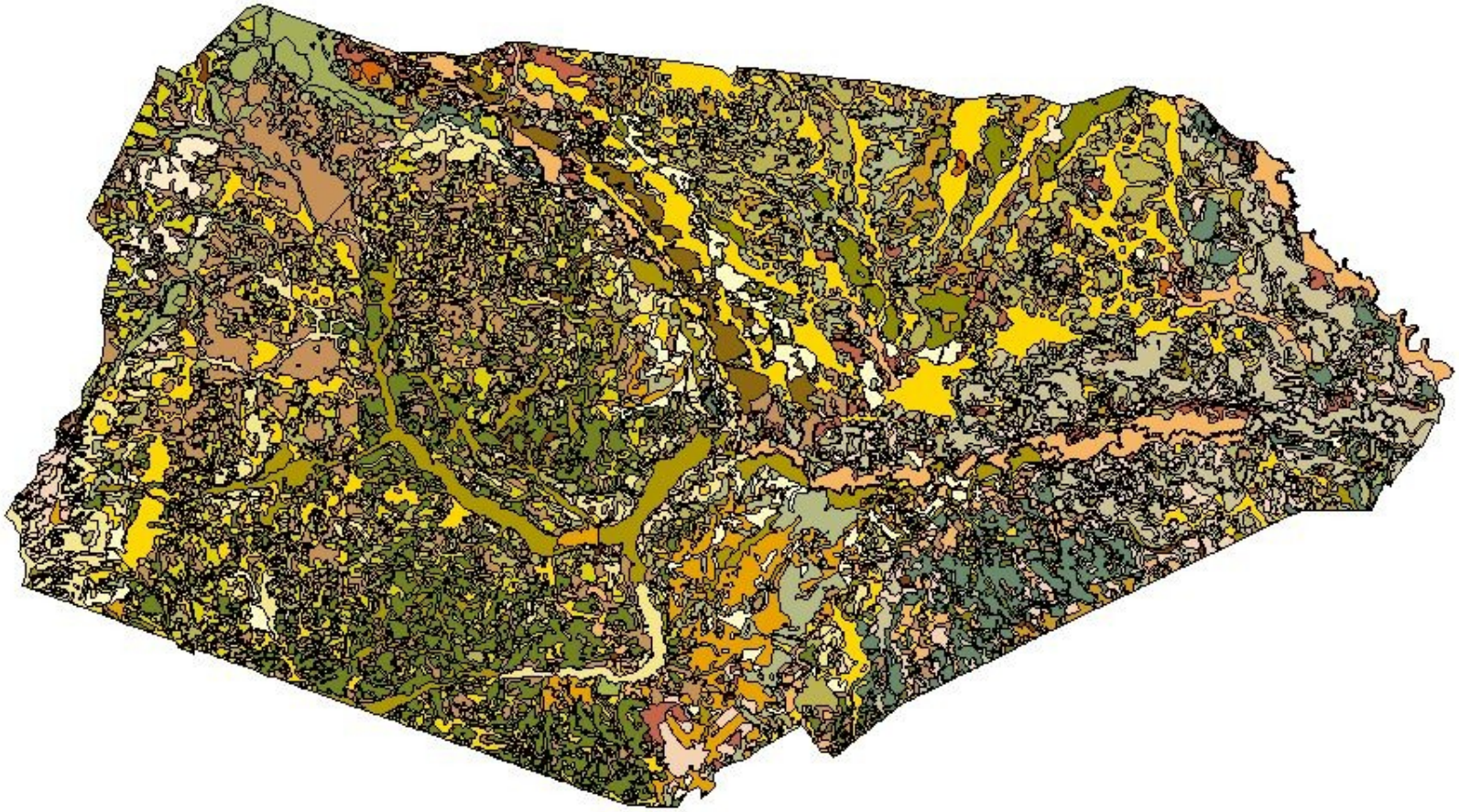
1987 Corps of Engineers Wetland Delineation Manual:

3 Characteristics for Wetland Determination

1. Hydric Soils
2. Hydrophytic Vegetation
3. Hydrology

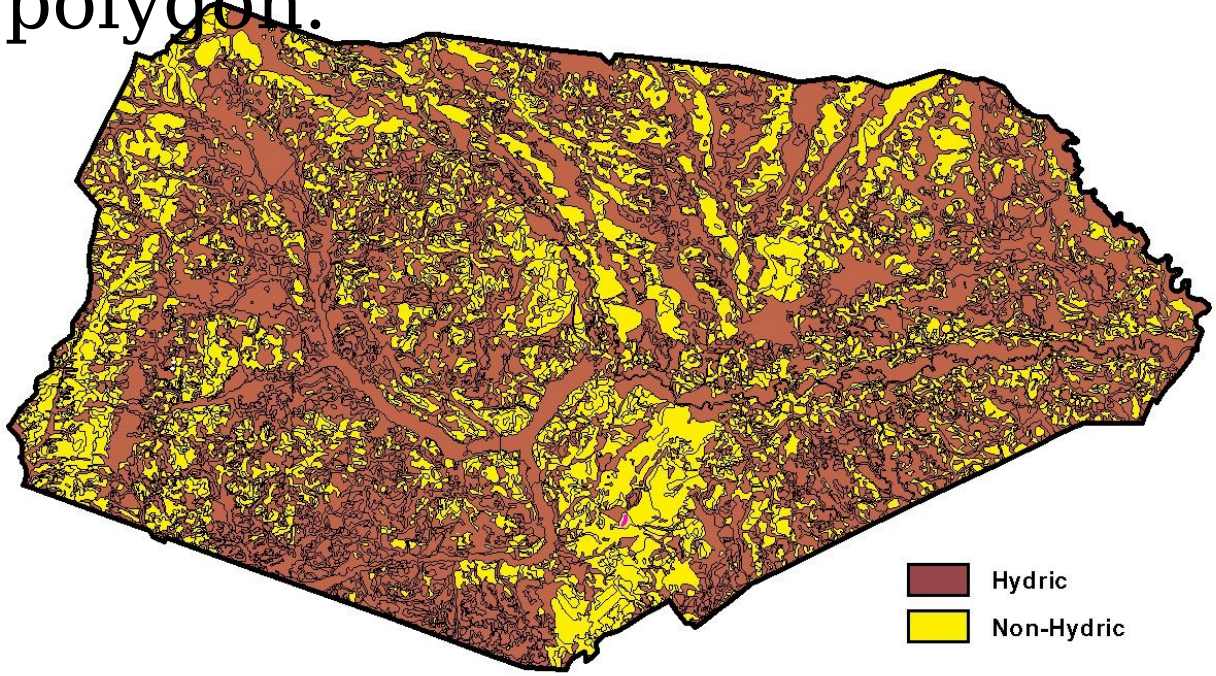
HYPOTHESIS: If we can obtain two of the required features in our GIS, the third feature is likely to be present as well.

Soils Layer From NRCS

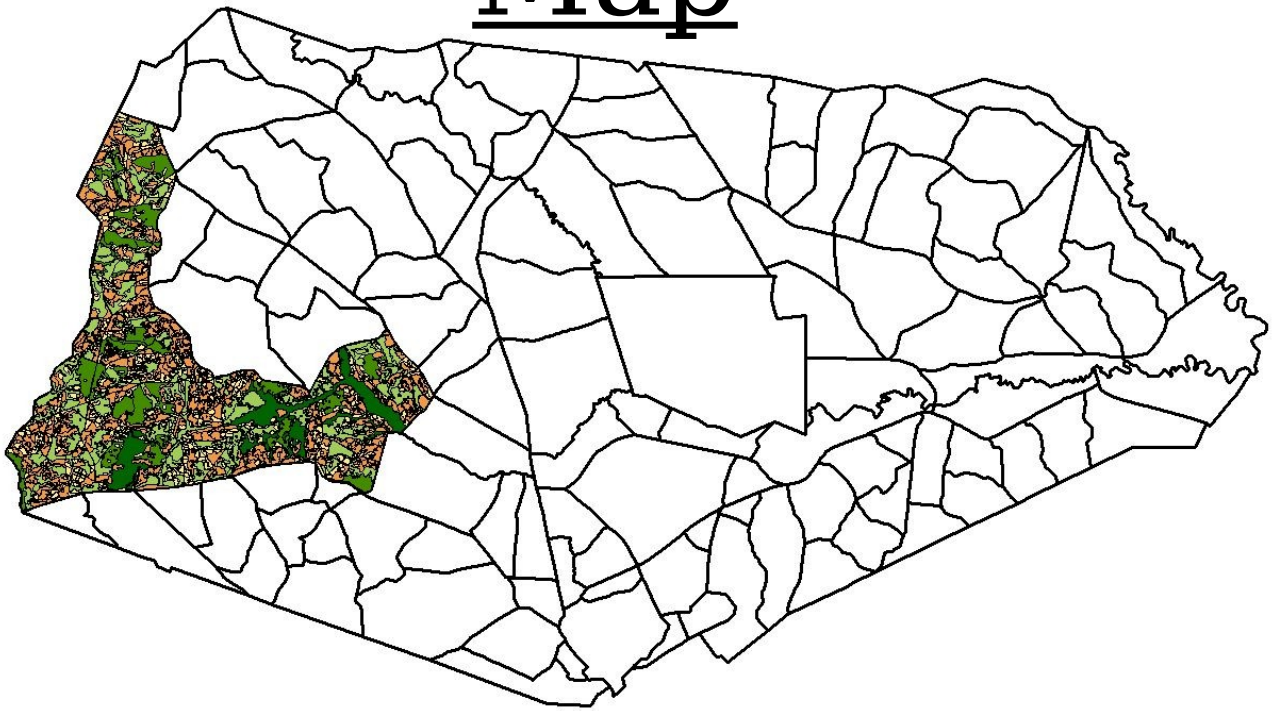


Hydric Soil Layer

- Using the list of hydric soils for Georgia from the NRCS we assigned “hydric” & “non-hydric” values to each soil polygon.

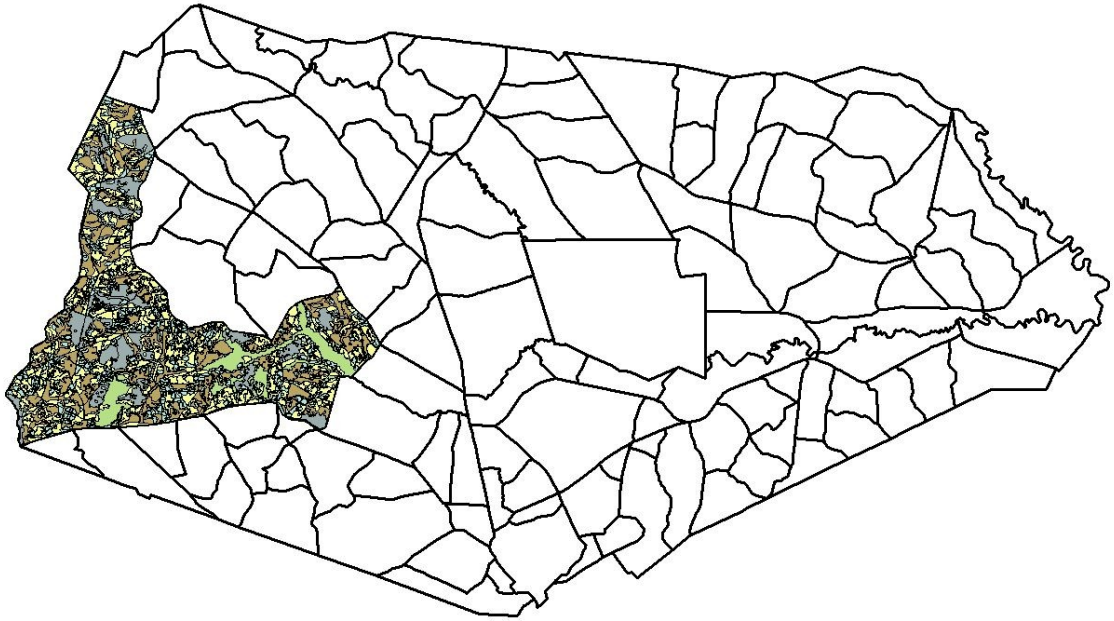


Vegetation Layer Using Fort Stewart Vegetation Map



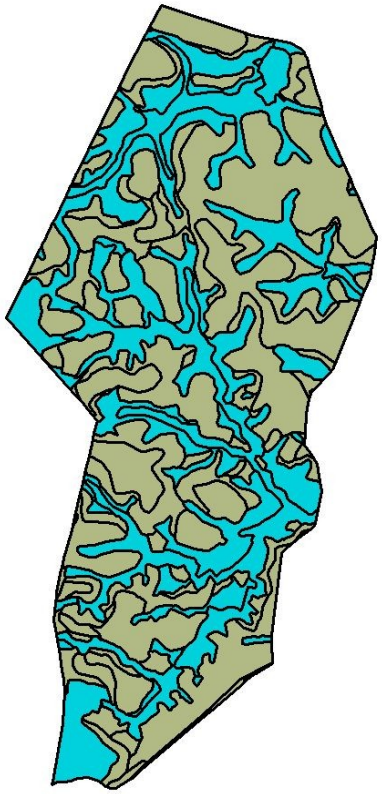
Hydrophytic Vegetation Layer

- Created a list of hydrophytic vegetation communities from determining the hydrologic regime that each community forms in.

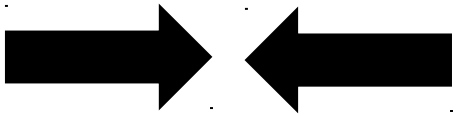


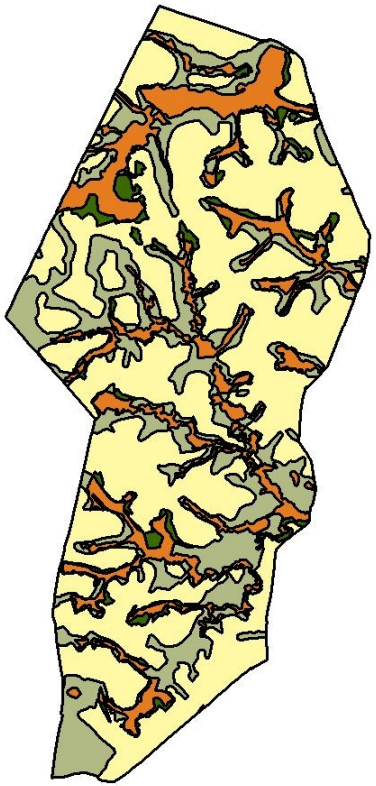
Intersection

Combined vegetation and soil layers using ArcView's 'intersect' function.



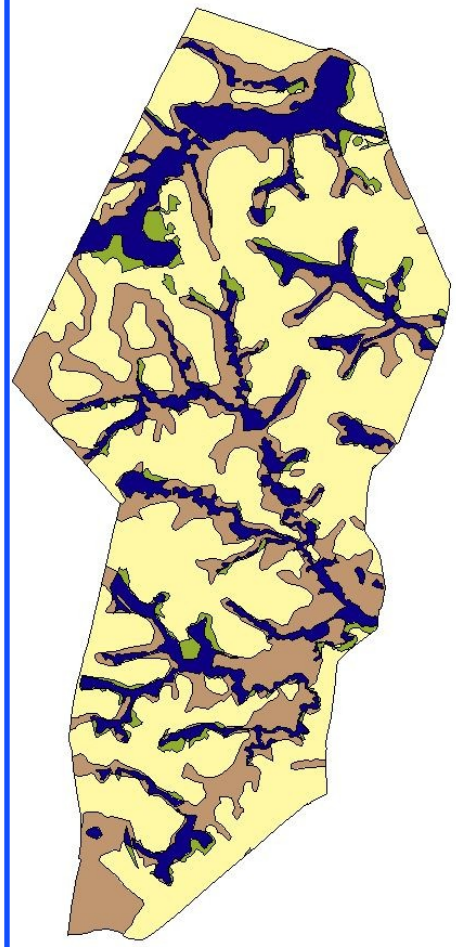
Hydric Soil





Hydrophytic Vegetation

A New Layer



HIGH- Wetland Vegetation and Hydric Soils

MEDIUM-VEG- Wetland Vegetation and Non-Hydric Soils (with a concentration on veg.)

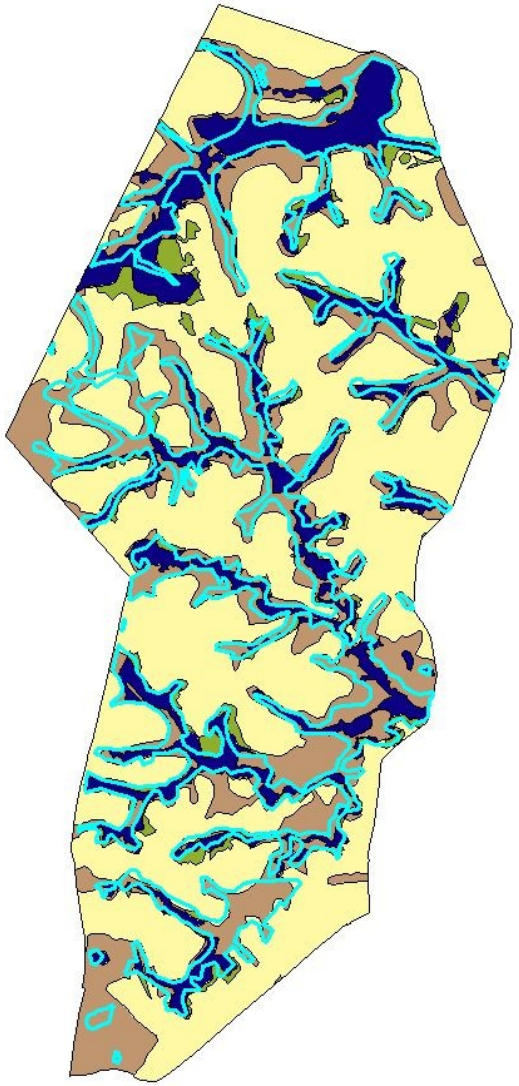
MEDIUM-SOILS- Upland Vegetation and Hydric Soils (with a concentration on soil)

LOW- Upland Vegetation and Non-Hydric Soils

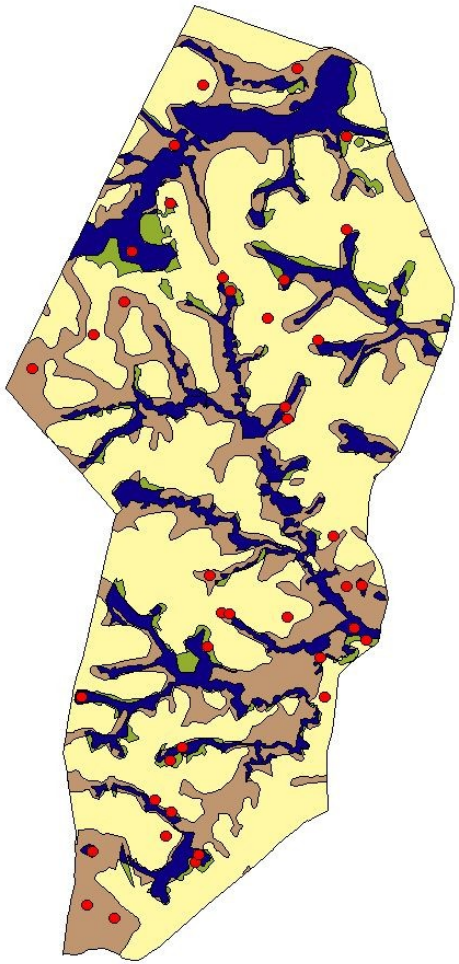
Ground Truthing:
1st Round Summer 2000

Added the NWI Layer to Create 8 Cat

1. High
2. High/NWI
3. Med-Veg
4. Med-Veg/NWI
5. Med-Soil
6. Med-Soil/NWI
7. Low
8. Low-NWI



Checkpoints



Randomly selected 40 points lying within the project area, 5 in each of the 8 categories

Using Standard USACE Methods (1987 Manual), We Determined the Wetland Status

RESULTS

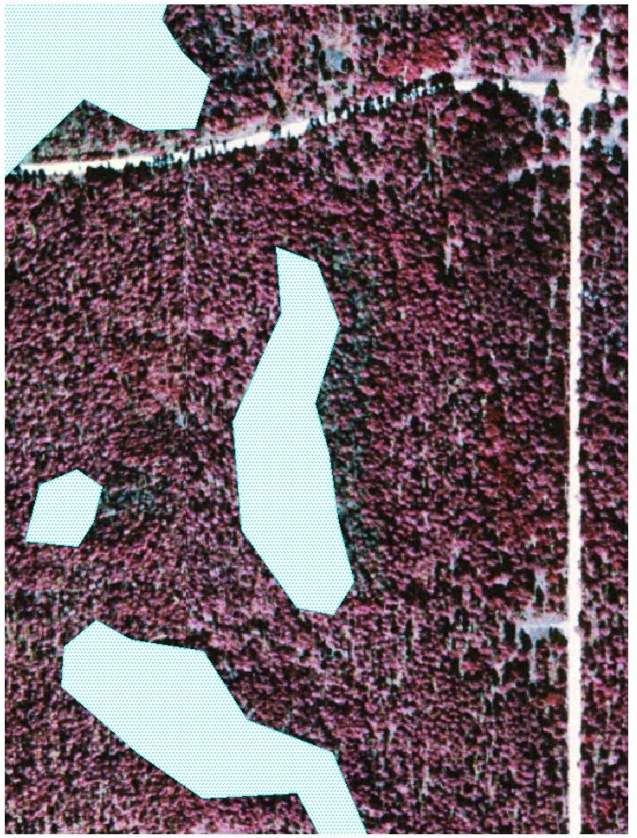
Category	Wetland/Total	Wetland %
Low	0/10	0%
High	10/10	100%
Medium Veg	3/10	30%
Medium Soil	5/10	50%
NWI		
Low/NWI	0/5	0%
High/NWI	5/5	100%
Med-Veg/NWI	3/5	60%
Med-Soil/NWI	4/5	80%
NWI Totals	12/20	60%

→ Rock of the Marne

Ground Truthing:
2nd Round Summer 2001

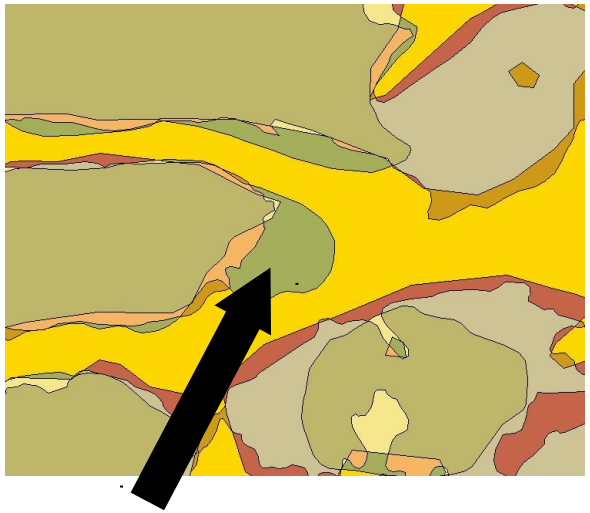
Comprehensive Delineation

- Conducted a Comprehensive Jurisdictional Delineation of a 5+ acre wetland



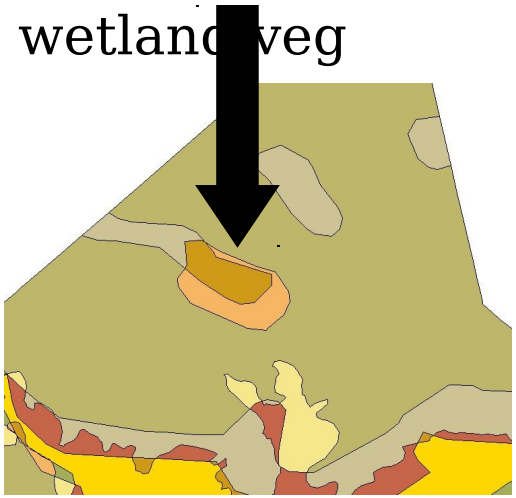
Additional Checkpoints

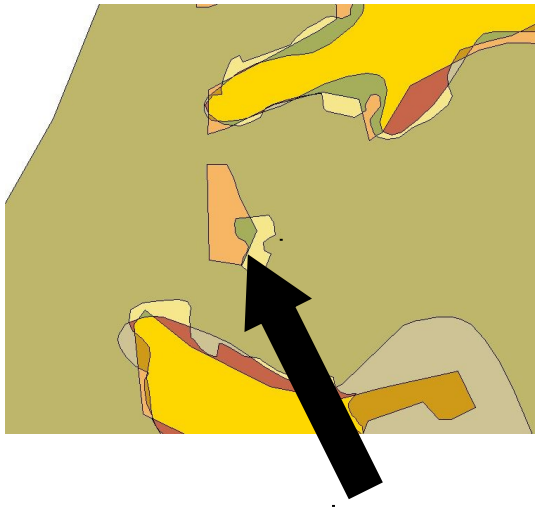
- Manually selected points in “problem areas” to determine wetland status



Large areas of wetland veg but no hydric soils

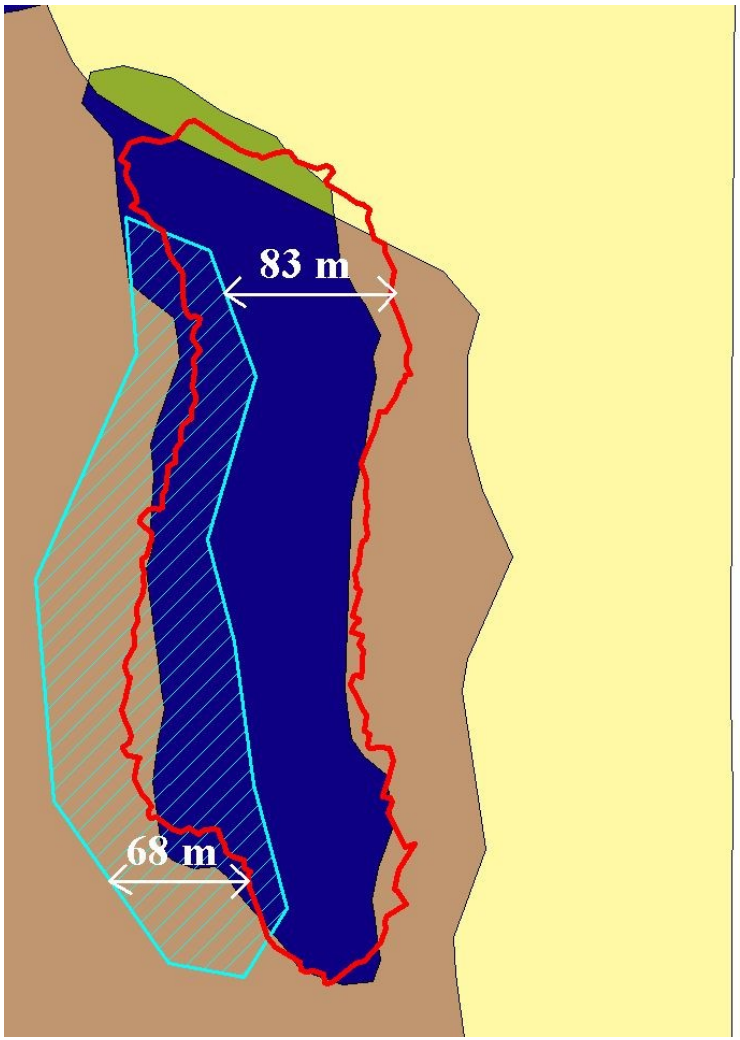
Isolated areas with hydric soils and NWI but no wetland veg





Isolated areas with wetland veg and NWI but no hydric soils

Delineation Results



Wetland Delineation

NWI Wetlands

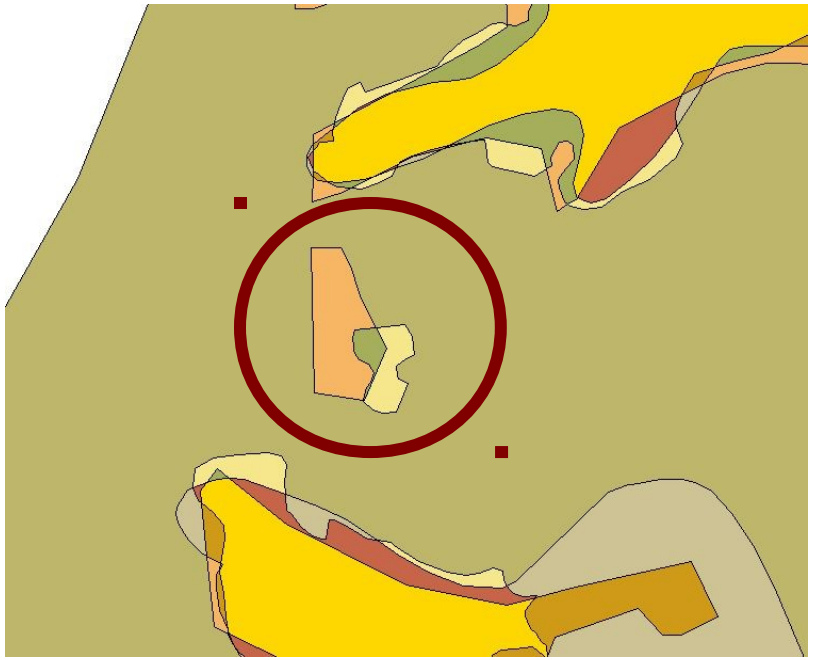
High

Med-Veg

Med-Soil

Low

Problem Area Results



- Generally, when the NWI indicated a wetland, there was a wetland in the area, though most of the time the boundaries were significantly incorrect.

Conclusions

- When dealing with wetland limits, the new layer seems more correct in determining actual wetland boundaries.
- However, the NWI seemed better able to detect smaller wetlands and found a few areas the were not detected by either the vegetation or the soils layer or both.
- When used in conjunction with each other, they will be a valuable tool in determining wetland location in

Possible Causes of Inaccuracies in the New Layer

1. Inaccuracies in the soils layer
2. Inaccuracies in the vegetation m
3. Inaccuracies in digitization

Questions?